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Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland 20014, giving full name, rank, corps, and old and new addresses.

FRONT COVER: The U.S. Naval Hospital, Quantico, Virginia, is situated on an elevated point of land on the west bank of the Potomac River at the confluence of Quantico Creek with the river. The original hospital building was erected in 1939 at a cost of $943,000 as the dispensary for the Marine Barracks but was established as a naval hospital on 1 July 1941 by order of the Secretary of the Navy, with CAPT J. B. Pollard MC USN, in command. Upon commissioning of the hospital, the boundary between the hospital reservation and the Marine Corps Base was drawn from the right of way of the railroad on the west across the point of land in a straight line at the level of the road bordering building No. 2203 on the south. This area comprised about 40 acres.

The main hospital building, as originally constructed, was a brick structure of colonial design with a central portion of three stories and two 2-story ward wings extending to the rear. During 1942 an expansion program was carried out by the erection of a new west wing to the main building, a combined maintenance building and isolation unit in a two story brick building to the west of the main building, and a one story wooden H-type building to the rear of the main building.

In 1943, an exchange of land was effected between the hospital and the Marine Barracks, the hospital receiving a tract of about 20 acres. The hospital transferred to the Marine Barracks a tract of land lying to the south of this area. This exchange of land increased the area of the hospital reservation to about 60 acres and added 13 dwellings which were designated for use as quarters.

The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

MEDICAL ARTICLES

SURGICAL MANAGEMENT OF GASTROINTESTINAL HEMORRHAGE FROM AN UNDETERMINED SOURCE

Robert M. Appleman MD, Resident in Surgery, Oliver H. Beahrs MD, Section of Surgery.* *Mayo Clinic Proceedings 40(2): 121-126, February 1965.*

Gastrointestinal hemorrhage of obscure origin is encountered frequently enough that it is of more than passing concern to physicians. Since bleeding can occur for many reasons, definitive management in unexplained cases is extremely difficult. In general, surgical consultation is requested under two circumstances: (1) when bleeding is massive and uncontrollable by medical measures and (2) when all other diagnostic measures have failed to reveal the source of blood loss.

Discussion of this problem in the literature has often been divided by the nature of the bleeding. A clinical history of hematemesis that may be massive suggests a lesion proximal to the ligament of Treitz. Peptic ulceration is considered responsible in most undetermined cases. Some other causes are esophageal or gastric varices, diffuse gastritis or duodenitis with superficial ulceration, benign tumor of the stomach, hiatal hernia, and rarely a lesion of the biliary tract. When melena alone occurs the difficulty of localization is increased because the rate of blood loss may be compatible with a lesion anywhere along the gastrointestinal tract. The list of possibilities is indeed extensive and has been well documented.[1,2]

While melena alone may not appear as dramatic as that associated with hematemesis, it may nonetheless lead to rapid deterioration of physical status. Therefore some of the indications for emergency surgical intervention should be noted. These include (1) a hemoglobin concentration of 8 gm or less per 100 ml of blood or an erythrocyte count of 3,500,000 or less per cubic millimeter, (2) clinical evidence of hypotension in a patient who cannot be maintained hemodynamically with 500 ml of whole blood every 8 hours, (3) a history of bleeding for 48 hours despite medical management and (4) multiple and recurrent hemorrhages.

When careful exploratory laparotomy fails to establish the source of blood loss, the surgeon must decide whether to terminate the procedure or perform so called blind gastrectomy. From a historical standpoint, this procedure has been discussed in relation to peptic ulcer management, and gastric resection for massive bleeding was advocated by early surgeons. However, the technical problems, including blood replacement and practicable anesthesia, delayed the popularity and feasibility of this approach for several decades. It was recognized that superficial ulceration producing hemorrhage was not always palpable and was sometimes difficult to visualize even with gastrotomy. Peptic ulceration or superficial gastritis was known to be a major cause of gastrointestinal hemorrhage, and Wangensteen[3] in 1945 was one of the first to suggest subtotal (75 per cent) gastric resection to terminate bleeding. The concept of blind gastrectomy was embraced by many surgeons and reports appeared in the literature citing five to 10 cases as part of the total experience with gastric resection for duodenal ulcer wherein bleeding was successfully controlled.[4,5] Gilchrist and Chun[6] cautioned that in certain cases in which ulceration was situated high in the cardia, a standard resection would not terminate bleeding. Similarly Cole[7] predicted that unnecessary resections would be performed with the lesion remaining outside the resected specimen.

In 1954 Gray and colleagues[8] reported 48 cases of indeterminate gastrointestinal bleeding seen at the Mayo Clinic from 1937-1946. The bleeding was confirmed by historical physical and laboratory data. At laparotomy the cause of the bleeding was not ascertained by gross inspection or palpation. Of this series, 28 patients had a laparotomy without any

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definitive surgical procedure and the other 20 patients underwent a "blind" subtotal gastrectomy. Follow-up information was obtained on all patients. Bleeding recurred in 63 percent of those who underwent laparotomy only and in 11 per cent of those who underwent "blind" resection. Although this series was small, it seemed reasonable to conclude that gastric resection was of some value in patients who had bleeding from an unknown source.

Method and Material

In the present study the records of all cases in which a diagnosis of gastrointestinal bleeding was made from 1946 to 1956 were initially reviewed. All non-surgical cases were eliminated, as well as those surgical cases in which a definite explanation for bleeding was established. Patients who had had a previous operation for peptic ulcer were also excluded. Finally, in those cases in which a "blind gastrectomy" had been performed the pathology report was classified as one of chronic gastritis and duodenitis without evidence of ulceration or other source of hemorrhage. Sixty patients met the criteria and follow-up-information was available on all for periods varying from 5 to 17 years.

Results

Thirty-one patients were males ranging in age from 4 to 70 years (average 44.5) and 29 were females ranging in age from 6 to 74 years (average 48.9). Symptoms of bleeding included hematemesis alone in two, melena alone in 37, both hematemesis and melena in 15, and anemia or occult bleeding in six. Fifty of the 60 patients satisfied the criteria for massive bleeding noted previously, while 10 patients bled to a lesser degree. Thirty-one patients had had a history of hemorrhages for less than 1 year, 21 for 1 to 5 years, and eight for over 5 years. Fifteen patients were known to have had one or more transfusions in the preoperative period. The number of episodes of bleeding varied, and in 22 the bleeding occurred as a single episode or was occult. Bleeding occurred two to five times in 26 patients and more than five times in 12 patients. Preoperative values for hemoglobin ranged from 4.9 to 14.5 gm (average 10.5 gm).

Numerous x-ray examinations were made, including multiple examinations in many patients. These did not show any abnormality of the stomach in 53 patients, of the colon in 48, and of the small bowel in 39. X-ray examination was not done in five patients. Abnormalities observed roentgenologically included a diverticulum of the stomach in one, a questionable duodenal ulcer in three that was not confirmed at subsequent operation, a duodenal ulcer and a gastric ulcer in one case each on roentgenograms taken elsewhere and read here but neither ulcer being demonstrable at operation, a diaphragmatic hernia in one case, and a questionable extrinsic mass on the posterior wall of the stomach that was not found at subsequent operation.

The patients could be divided into two groups, according to the surgical procedure performed. In the first group, consisting of 44 patients (19 females and 25 males), laparotomy without definitive surgical treatment for the gastrointestinal bleeding was performed. In this group, incidental surgical procedures for lesions unrelated to gastrointestinal bleeding were frequently performed, and these included incidental appendectomy in 19 cases, gastrotomy or pyloroplasty or both in nine, cholecystectomy in five, liver biopsy in three, total abdominal hysterectomy and bilateral salpingo-oophorectomy in one, cecotomy in one, ileotomy in one, splenectomy in one, and excision of an ovarian cyst in one.

The second group consisted of 16 patients (six males and 10 females) who underwent gastric resection, including seven who had 40 to 50 per cent of the stomach removed and nine who had approximately two thirds of it removed. None had vagotomy.

Of the 44 patients who underwent laparotomy without a definite operation for bleeding, 18 had recurrence of a gastrointestinal bleeding (41 per cent). Of the 16 who underwent gastric resection, five had recurrence of bleeding. (31 per cent).

Comment

The recurrence rates for hemorrhage in the present series (41 per cent and 31 per cent) differ from those in the series reported by Gray and associates.[8] One reason for the difference may be the manner of selection of patients. Some of the patients included in the series of Gray and associates had had previous gastric operations, presumably because of peptic ulcer. Also in more than 50 per cent of their cases subsequent pathologic examination of surgical specimens showed evidence of peptic ulcer disease in the form of ulceration or healed scar of previous medically arrested disease. Our series excluded patients who had any pathologic evidence of new or old ulceration. Even though the surgeon cannot select patients in this manner, we suspect that if such a group had been included in our series the recurrence rates would have been more like those reported by Gray and associates.[8] Also some patients in our se-

ries possibly had had superficial ulceration that had healed by the time surgical exploration was performed. Unfortunately gastric acids were determined in only a small number of our cases since a history suggestive of peptic ulcer was not obtained. The values recorded for gastric acids in fasting patients were noted to be within or below normal range.

Perhaps some light can be shed on the problem of recurrence by reviewing the subsequent history of those patients in whom postoperative bleeding was reported. Of the 18 patients who had a laparotomy only, an explanation for recurrent bleeding was later suggested in seven: a duodenal ulcer subsequently diagnosed in two, gastric ulcer in one, hiatal hernia in one, diverticulitis in one who had segmental colectomy, erosive gastritis in one, and factitial purpura and associated hemorrhage in one; in the other 11 melena persisted postoperatively without a diagnosis. A second laparotomy with negative results was carried out at the Mayo Clinic in one instance with further recurrence of bleeding. Four patients subsequently had a sub-total gastric resection, and two of these had a still further recurrence of bleeding. One of the patients in whom duodenal ulcer was definitely diagnosed underwent vagotomy and no further bleeding was reported.

Of the five patients with recurrence following gastric resection, a shallow gastric ulcer was detected by x-ray means in one, and no definitve diagnosis was made in the remaining four. All of these patients have been treated medically.

Looking at this problem in still another way, one might wonder whether the acuteness of bleeding may have been a factor in the comparative rates of recurrence. Six of 17 patients with hematemesis had a recurrence of bleeding. Eight of the 17 had an initial resection with two recurrences, and nine underwent laparotomy with a recurrence in four. These figures appear to favor resection for bleeding of the upper part of the gastrointestinal tract, but the groups are too small for final conclusions to be drawn. Similarly, of 43 patients who had melena or occult bleeding, 17 had a subsequent recurrence (14 of 35 who underwent laparotomy and three of eight who underwent gastrectomy). These data correspond fairly well with those reported by Retzlaff and associates,[9] who reviewed 100 consecutive cases of unexplained melena seen at the Mayo Clinic from 1952 to 1958. In all cases, exploratory laparotomy was performed. In 53 patients a positive diagnosis could not be made by gross inspection and palpation. Of 48 patients who replied to follow-up letters, 27 reported further bleeding. These data suggest that in patients who present melena alone, it may be more difficult to determine and correct the difficulty and that gastric resection may or may not help such individuals.

Opinion is divided regarding the value of gastrotomy to locate bleeding. Of our patients who underwent gastrotomy with or without pyloroplasty, five had a subsequent recurrence of bleeding and four had no recurrence, so that no statement regarding the value of this procedure can be made from the present data. However, we believe that gastrotomy should be considered in cases in which a lesion is not found on palpation or inspection.

Summary and Conclusion

Of 60 patients with unexplained gastrointestinal bleeding, 18 of 44 (41 per cent) who underwent laparotomy alone subsequently had recurrence of bleeding, while five of 16 (31 per cent) who underwent partial or subtotal gastrectomy had recurrence later. Retrospective study of a small series such as this, in which patients are selected in a prescribed manner, does not permit one to draw any definite conclusions about the validity or efficacy of so-called blind gastric resection as applied to a particular patient. Certainly management of each patient must be individualized on the basis of history, physical, and laboratory findings and the data reported suggest that there is no routine approach to the prevention of recurrent bleeding.

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DIURETICS AND ELECTROLYTE ABNORMALITIES IN CONGESTIVE HEART FAILURE

W. Gordon Walker MD, Associate Professor of Medicine, C. Robert Cooke, MD, Instructor in Medicine, Johns Hopkins Hospital, Baltimore, Md. Modern Concepts of Cardiovascular Disease XXXIV(4): 17-22, April 1965.

Among the electrolyte disturbances which may be encountered during the course of managing patients with congestive heart failure, the clinical picture usually denoted by the term "dilutional hyponatremia" presents the most difficult problem in therapy. This syndrome is commonly grouped with disturbances resulting from diuretic therapy but it is probably more nearly correctly considered a stage in the progression of cardiac decompensation. As indicated below, the importance of distinguishing between this disorder and sodium depletion cannot be overstressed. For this reason, the pathogenesis and management of dilutional hyponatremia will be considered first in the discussion to follow and the electrolyte disturbances commonly seen as complications of diuretic therapy will then be considered.

Dilutional Hyponatremia

Perhaps the most severe and therapeutically the most difficult of the clinical electrolyte disturbances encountered in congestive heart failure is the moderate to marked hyponatremia that is frequently observed in patients with severe congestive failure and marked edema. Although when first recognized this situation was interpreted as representing salt depletion, response to sodium administration was rather uniformly disappointing and frequently resulted in marked accentuation of symptomatology. The demonstration by Edelman and his co-workers that such patients invariably had marked increases in total exchangeable sodium as measured by isotope dilution techniques led to the appropriate interpretation of this disorder as one of dilutional hyponatremia with relative water intoxication. The total exchangeable sodium measurement in these patients virtually always exceeded normal values by 50% and frequently were 100% above normal values. The lowered concentration of sodium appeared to be the result of retention of relatively greater quantities of water than sodium. The clinical manifestations associated with this disturbance are variable and depend upon the severity of the condition. The patients generally exhibit signs of severe congestive failure, but in addition they may develop rather profound mental aberrations including disorientation, somnolence, and even on occasion, coma. Convulsions are rarely encountered.

The mechanisms responsible for the development of this disturbance are not completely understood. Explanations which have been advanced include inappropriate secretion of the antidiuretic hormone (ADH), disturbance in renal hemodynamics which render the kidney incapable of excreting solute free water at a normal rate, and lastly inactivation of cell base or "primary intracellular hypotonicity." Regardless of which of these explanations is correct, the ultimate defect is an inability of the kidney to excrete solute free water. The clinical manifestations that are superimposed upon the usual symptoms of congestive failure are those of water intoxication. In general, these correlate well with the degree of hypoosmolality and the serum sodium concentration.

The evidence for and against the proposed mechanisms listed above has recently been presented. Evidence for inappropriate ADH secretion includes the observation that the syndrome can be reproduced by the administration of pitressin to patients with congestive heart failure over a period of several days. In addition, increased quantities of circulating antidiuretic hormone have been reported by bioassay techniques, although the specificity of these data may be questioned. The stimulus for continued ADH secretion is not apparent and it is of interest that water diuresis cannot be induced in these patients by the administration of alcohol, a maneuver which has been shown to inhibit production of ADH in the normal individual.

It has been clearly shown experimentally that progressive reduction in the glomerular filtration rate (GFR) and renal blood flow will render the kidney incapable of producing a dilute urine in the absence of ADH. Virtually all patients who develop chronic dilutional hyponatremia have evidence of severe reduction in renal blood flow and GFR and are fre-

quently moderately azotemic. It does seem quite likely that these alterations play a significant role in the pathogenesis of the syndrome, even though other factors may be involved. The evidence supporting a decrease or inactivation of cell base as a primary explanation for the hyponatremia is less impressive than that tending to incriminate the two other mechanisms.

The most successful treatment of this disturbance, in the authors' experience, has been water restriction. Since the kidney is incapable of excreting solute free water, the only means whereby it can be removed is by way of extrarenal routes. In order to make certain that this is an effective maneuver, rigid restriction of water is necessary. If water intake is kept to a total volume of 600 to 800 ml per day, however, a progressive decline in weight is seen in these patients together with a corresponding rise in serum sodium. Although mercurial diuretics have been advocated as an effective means of treating this condition, it has been our experience that mercury given in the presence of marked hyponatremia is nearly always completely ineffective. However, if the serum sodium concentration is restored to near normal levels with water restriction, patients usually regain their ability to respond to diuretics with an increased sodium excretion. This means of getting rid of excess water is admittedly slow and dramatic results should not be expected. However, using this regimen of water restriction for a period of six to eight days, together with rigid sodium restriction and administering diuretics after the serum sodium rises to 135 mEq/L or more, has resulted fairly uniformly in subsequent diuresis and symptomatic improvement. This regimen has been used successfully to treat patients with severe heart failure who have initial serum sodium concentrations below 110 mEq/L.

The use of inert osmotic diuretics, such as mannitol, has been advocated for the treatment of dilutional hyponatremia. The rationale upon which this therapy is based is that osmotic diuresis increases the rate of delivery of sodium and other solutes to the distal diluting segment of the nephron and thereby increases the maximal rate of excretion of solute free water. While this rationale is well supported by experimental fact, in practice such agents all result in transient expansion of the vascular volume and may aggravate the symptoms of congestive failure; pulmonary edema may be precipitated with disastrous consequences. For this reason, we have preferred not to use such agents in the treatment of dilutional hyponatremia in patients with congestive heart failure.

Hypokalemia

The secondary hyperaldosteronism that is a part of congestive heart failure increases the tendency of the kidney to exchange potassium for sodium as part of the increased sodium conservation seen in this disease. As a consequence, deficits in body potassium may develop in heart failure quite apart from any specific effects of diuretics of potassium secretion. In addition, this potassium-losing tendency is markedly aggravated by the benzothiadiazines and carbonic anhydrase inhibitors and may lead to marked potassium depletion. Since all, or nearly all, potassium which appears in the urine is secreted in the distal tubule, and since this secretory process is dependent upon adequate quantities of sodium reaching these sites, K depletion is more striking and is likely to occur much more rapidly in patients with relatively mild heart failure who exhibit excellent responses to the above diuretics. In more severe cases in which the diuretic produces little or no increased sodium loss, potassium loss may not be so great. It may, however, continue to occur since such patients frequently respond to the administration of such agents as acetazolamide or chlorothiazide with increased potassium excretion in the urine. This is presumably because the diuretics are effective in increasing the quantity of sodium that reaches the distal segment of the nephron, serving only to increase sodium-for-potassium exchange, the predominant result being increased potassium excretion.

Hypokalemia is most common in patients who exhibit an excellent response to any of the diuretics which produce kaluresis, and in such situations, clinically significant hypokalemia may be produced in a relatively short period of time, such as six to eight days. In addition, patients who are maintained for long periods of time on chlorothiazide diuretics may develop striking K depletion. This is particularly true in those in whom it is possible to effect complete reversal of the symptoms and excess fluid retention of heart failure by daily administration of diuretics. These patients continue to lose potassium and may lose it in greater quantities when they are free of edema. Because of this, all patients who are maintained on benzothiadiazines should receive regular potassium supplements. It should be emphasized, however, that there is also the hazard of hyperkalemia in these patients should their congestive failure become worse or should they become refractory to the diuretics in the doses given. The quantity

of potassium necessary to maintain potassium balance in patients with heart failure who are receiving diuretics is quite variable, depending both upon the response to the diuretic as well as upon the total sodium intake. For this reason, it is important to check the serum potassium at regular intervals, even in patients who appear stable. Occasionally, dosages in excess of 4 or 5 g of KC1 are required to maintain adequate potassium balance in the individual, but usually 2 to 3 g a day are sufficient to avoid hypokalemia. In newly discovered cases of congestive heart failure, it is preferable to treat the patient with diuretics initially for a period of several days without supplemental potassium administration and then adjust the potassium intake after the patient has been returned to his "dry weight" with initial diuretic therapy. In this manner, the danger of producing hyperkalemia is considerably reduced.

Hyperkalemia

It has long been known that patients with severe congestive heart failure have difficulty excreting excess quantities of potassium. Thus, the ingestion thereof by patients with congestive heart failure produces a higher rise in the plasma potassium that is sustained for a longer period of time than that following a comparable intake of potassium in a normal individual. More recently, it has been recognized that this is principally the result of deranged renal sodium transport in congestive heart failure and generally occurs at a later stage in the disease than the hypokalemia that is due in part to secondary hyperaldosteronism. When the kidneys in heart failure are retaining sodium most avidly, relatively little sodium reaches the distal site in the tubule where sodium-for-potassium exchange occurs. When sodium is unavailable, potassium cannot be excreted. Thus, there is always a hazard of hyperkalemia associated with potassium administration. Although this phenomenon can be overcome quite readily by the use of diuretic agents that promote potassium loss, situations are frequently encountered in which this derangement of renal-potassium transport is of clinical significance. It is most likely to occur in patients with severe congestive failure and the greatest hazard arises in those patients who are either receiving diuretics that inhibit K secretion (mercurials, spironolactone) or in patients who are failing to respond to diuretics. Since potassium supplements are routinely given when newer agents, such as chlorothiazide or one of its derivatives, are used, should such patients become unresponsive to diuretics while potassium administration is continued, the hazard of hyperkalemia is genuine and may be life-threatening. We have observed levels of 8.5 and 9 m Eq/L when potassium administration was continued inadvertently under these circumstances. Potassium administration should therefore be initiated with caution in all patients with severe congestive heart failure and should such patients fail to respond to diuretics, potassium dosage should be promptly curtailed or stopped. If continued for any reason, the patient should be followed carefully with serial plasma-potassium determinations since, in the presence of profound heart disease, electrocardiographic manifestations of hyperkalemia are unreliable.

This tendency to hyperkalemia is aggravated by certain diuretics. Since aldosterone antagonists (spironolactone) tend to suppress distal exchange of potassium for sodium, the use of these agents aggravates the tendency to retain potassium with resultant hyperkalemia. Thus, when these agents are used in conjunction with some diuretic drug, such as chlorothiazide, care should be exercised in regulating potassium administration. Mercurial diuretics may also tend to aggravate potassium retention in severe congestive heart failure although, as indicated above, they occasionally result in increased potassium excretion. The combination of mercurials and spironolactone is particularly hazardous and it is unwise to administer supplemental potassium when patients are receiving this combination of diuretics.

Disturbances in pH

The following changes in pH of the body fluids in congestive heart failure are important: First, those that result from the use of diuretics and thus represent a complication of diuretic therapy. Second, those that alter the renal effect of the diuretics commonly used.

A common consequence of the use of diuretic agents which produce a sodium diuresis by depressing sodium-chloride transport is the development of a hypochloremic alkalosis. Since these agents selectively depress sodium chloride reabsorption, there is a tendency on the part of the kidney to compensate for the sodium loss by increasing distal ion exchange. The increased exchange of hydrogen and potassium for sodium results in a greater excretion of chloride ion than a sodium ion. As this continues, significant hypochloremia develops. This anion deficit is repaired by increasing bicarbonate concentration and thus the over-all effect is the production of a hypochloremic alkalosis. This may be aggravated to varying degrees by the added complication of potassium depletion. As potassium depletion proceeds,

the loss of intracellular potassium is repaired by a combination of sodium and hydrogen. The source of this hydrogen is the carbonic acid which results from hydration of CO^2. After dissociation, the hydrogen enters the cell, leaving the bicarbonate ion to occupy an extracellular position. Thus, this produces an intracellular acidosis but may aggravate an already existent hypochloremic extracellular alkalosis which occurs with mercurial diuretics and with chlorothiazide and related thiazide diuretics. These changes, with the exception of the hypokalemia, are not usually responsible for any striking clinical manifestations. It is difficult to dissect any discreet group of symptoms from the over-all symptom complex of congestive heart failure in such patients. Their principal importance, as indicated below, lies in the modifying effect which they exert upon diuretic action.

Carbonic anhydrase regularly produces a systemic acidosis as a part of its pharmacological action, since it operates by rendering the kidney incapable of excreting an acid load. The result is a progressive systemic acidosis during the period in which the kidney continues to produce an alkaline urine, which may be of sufficient magnitude to produce severe symptoms.

The use of ammonium chloride as an adjunct to mercurial diuresis should be mentioned here. Because the hemodynamic changes in congestive heart failure frequently result in substantial depression of renal function, the kidneys' ability to excrete an acid load is correspondingly reduced. Under such circumstances, the administration of ammonium chloride may produce a profound systemic acidosis. Although such an agent should be used for only a short period of time prior to the administration of mercury and then withdrawn, it is occasionally continued for longer periods of time. This practice is to be strongly discouraged. Severe acidosis leading to, or at least contributing to the demise of the patient has resulted from such continued use of ammonium chloride. Although the combination of ammonium chloride and mercury is not now used as commonly as a result of the availability of effective nonmercurial oral diuretics, it is still occasionally employed in instances of severe heart failure and it is precisely in this group that difficulties are most likely to be encountered. If ammonium chloride is administered, it should under no circumstances be continued beyond the third day. Should it be considered necessary or desirable to use repeated courses of intermittent ammonium chloride administration with mercury, this should be done only under laboratory control and appropriate precautions should be taken to ensure that the interval between the courses of ammonium chloride is adequate to permit the patient to compensate for his acidosis. Since the major effect of this combination therapy is to potentiate the action of mercurials, and as an appropriate and effective acidosis can be produced with acetazolamide, it is preferable to use acetazolamide administration for a 48-hour period prior to the administration of mercurials to effect this potentiation rather than to risk the use of ammonium chloride therapy.

The action of certain of the diuretics in common clinical use are modified by changes in pH. As mentioned previously, mercury is potentiated by acidosis and is rendered less effective in the presence of alkalosis. There are data available which suggest that the most important pH change is the intracellular rather than extracellular pH. The hypochloremic alkalosis which accompanies the use of mercurial diuretics tends to reduce the effectiveness of these agents and probably accounts for the unresponsive state that ultimately results from long continued use of mercurial diuretics in severe heart failure. In contrast, chlorothiazide continues to be active despite the development of hypochloremic alkalosis, although this condition is likely to be encountered in a more severe form with the use of the thiazide agents than is seen commonly with mercury. As a result, much more marked disturbances are occasionally encountered with chlorothiazide and intermittent determinations of plasma sodium and chloride are necessary for adequate regulation of the patient with chronic congestive heart failure who is maintained on long-term diuretic therapy with these agents.

Finally, it should be mentioned that the acidosis produced by the carbonic anhydrase inhibitors tends progressively to suppress their diuretic effectiveness and they are thus of limited therapeutic value. Perhaps their greatest usefulness is as adjuvant therapy and the regimen is more effective if they are given intermittently just preceding the administration of mercury.

Acute Sodium Depletion

Perhaps the most common complication of diuretic therapy encountered in the treatment of congestive failure is acute sodium depletion, although it is commonly unrecognized. In general, since the effect of a given dosage of any of the several clinically available potent diuretics is greatest in mild and early cases of congestive failure, the greatest danger exists in the management of the newly discovered patient with congestive heart failure. Similarly, patients whose poor response to therapy is due to an

unrecognized high-sodium intake are likely to develop salt depletion when hospitalized, placed on rigid sodium restriction, and subjected to intense diuretic therapy. The symptoms of acute sodium depletion are lethargy and somnolence following closely upon a brisk diuresis induced by vigorous diuretic therapy. This is associated with complete disappearance of edema, and if the sodium depletion is marked, skin turgor may be reduced. In more extreme cases, there may also be a substantial drop in the blood pressure. These changes are associated with a characteristic pattern of laboratory data. The hematocrit may rise quite strikingly, sometimes by more than 15%. There is also an associated rise in the blood urea nitrogen. Occasionally, this may increase from normal, or near normal, levels to values in excess of 100mg%. This is particularly true in patients who have some impairment of renal function as a result of arteriolonephrosclerosis. The concentrations of sodium and chloride in the serum are, however, virtually always normal. This fact cannot be overemphasized since the clinician may be lulled into a false sense of security by a normal serum sodium concentration unless he is aware that the acute losses are either isotonic or hypotonic; thus, the concentrations of sodium in the serum remain normal or may actually increase slightly if water intake has been poor during the period of diuresis.

In general, this complication is not life-threatening and, if recognized, the changes can be reversed by merely liberalizing sodium in the diet. However, salt depletion should always be kept in mind, particularly with the more potent diuretics such as chlorothiazide and its derivatives since these agents may continue to produce natruresis in the face of severe sodium depletion. In such circumstances, severe sodium depletion and renal insufficiency may be produced.

Salt depletion can nearly always be avoided if diuretic therapy is initiated cautiously, in relatively low doses, increasing the doses only after allowing a sufficient period of time to permit evaluation of the patient's response to the initial therapy.

Chronic Sodium Depletion

In contrast to this sequence of events, chronic sodium depletion is rarely encountered. This is probably due in part to the fact that patients who are being maintained on an outpatient regimen tend to take in considerably more dietary salt than do patients placed on a strict regimen while hospitalized. Nevertheless, it does occasionally occur, more commonly during the summer, with extrarenal losses of sodium due to increased sweating. The early clinical manifestations of this disorder are weakness, frequently associated with muscle cramps. If severe and of long duration, this may also be associated with mental disturbances. On physical examination, the first striking finding is a complete absence of edema and poor skin turgor. There are no other signs of heart failure readily identifiable, the lungs being clear and no elevated venous pressure or hepatomegaly in evidence. The most striking laboratory finding in this condition is a marked lowering of the serum concentrations of sodium and chloride. Since the deficit is a chronic one, secondary mechanisms have operated to produce relative water retention in an attempt to maintain volume at the expense of osmolality or solute concentration. The hyponatremia is a reflection of the fact that the sodium depletion occurs slowly and over a prolonged period of time. Secondary compensatory mechanisms are activated which result in fluid retention, thereby maintaining volume at the expense of osmolality. Since sodium is the principal extracellular cation, this hypoosmolality is reflected in a corresponding reduction in serum sodium concentration. Other laboratory data show less striking derangement than that seen in acute sodium depletion. There may be mild azotemia, but the hematocrit rise is not so striking as is seen in the acute stage since the water retention results in a decrease in both intra and extracellular solute concentration.

The clinical distinction between the hyponatremia of chronic sodium depletion and the dilutional hyponatremia discussed earlier is of prime importance since therapy is so strikingly different. The most important distinguishing characteristic is the absence of edema in chronic salt depletion as compared with the presence of edema in dilutional hyponatremia. Indeed, in patients with chronic salt depletion, usually skin turgor is quite poor with the attendant clinical manifestations of loss of extracellular fluid volume (weakness, hypotension, etc). Historically, this situation is virtually always preceded by a period of improvement in the symptoms of congestive heart failure. It is only subsequently that the weakness, lethargy, and muscular cramps of sodium depletion appear. In dilutional hyponatremia edema is always a striking feature, as are other manifestations of congestive heart failure, including venous hypertension, pulmonary congestion, hepatomegaly, etc. The adequate and accurate distinction between these two conditions prior to clinical therapy cannot be overemphasized since the treatment of true sodium

depletion is the administration of salt, occasionally as hypertonic sodium-chloride. When hypertonic sodium-chloride is given to patients with dilutional hyponatremia, the results are always disappointing and frequently result in marked intensification of the patient's symptoms. Pulmonary edema is not an uncommon consequence of salt administration in the group with dilutional hyponatremia.

Replacement therapy in the rare patient with hyponatremia and a true sodium depletion should always be guided by an estimate of the total deficit. Since following sodium depletion and readjustment of the water shifts result in the solute deficit being distributed throughout total body water, a simple formula for calculating the total deficit is: normal serum [Na] − observed serum [Na] X 0.6 B. W.(kg) = total sodium deficit. Thus, a 60 kg man (ideal weight) whose observed serum sodium concentration is 115mEq/L has a deficit of 140 mEq/L − 115 mEq/L − 115 mEq/L X 0.6 X 60 or 900 mEq/ of sodium. Replacement should not, however, be designed to correct such a tremendous deficit rapidly since accompanying water shifts would result in tremendous overexpansion of the extracellular fluid, particularly when sodium chloride is given as a hypertonic solution. It is far better to use this as a guide to avoid overtreatment and in practice no more than half of this amount should be given within the first 48 hours of the time the patient is recognized to have a sodium deficit. If the patient is alert and is able to take nourishment by mouth, it is far more desirable to administer the sodium orally over a two- to three-day period rather than using the intraveous route. It cannot be overemphasized that this situation is only rarely encountered in congestive failure and one should be absolutely certain that a real deficit exists before initiating therapy. As emphasized above, the clinical identification of the presence of edema makes the diagnosis of sodium depletion untenable.

FROM THE NOTE BOOK

GLUCOSE EXCRETION IN THERMAL SWEAT

K. Gibinski, F. Kokot, A. Nowak, Department III Of Internal Diseases, Silesian Medical Academy, Zabrze. Polish Medical Journal III(5): 63, 1964.

The authors investigated sweat excretion of glucose in 50 healthy subjects and in one patient with diabetes. Profuse perspiration was obtained by application of high temperature. The glucose determinations were performed in both ways, by the Hagedorn-Jensen method and by the method of enzymatic glucose oxydation. The mean glucose level in the sweat was 20–39 mg% by the reduction method and 5–8 mg% by enzymatic method. In some cases glucose could not be detected at all by the enzymatic method.

Sweat glucose concentrations were steady and did not change within the period of 2 hours experiments as well as after glucose ingestion. The same steadiness of the sweat glucose concentration was shown in the patient with diabetes, despite hyperglycemia.

The investigations on the sweat glucose excretion deny similarity of sweat gland and kidney functions.

CHLOROMYCETIN

Hematologic Toxicity

An attempt was made to define further the relation of dosage to the myelodepressant effect of Chloromycetin (chloramphenicol). Forty-one adult patients were given the antibiotic orally in a daily dose of 2 or 6 Gm. Twelve additional patients served as controls. Toxic bone-marrow depression, predominantly affecting erythropoiesis, developed in 2 of 20 patients given 2 Gm. Chloromycetin daily and in 18 of 21 patients given 6 Gm. daily. The 6-Gm. dose produced persistently high plasma drug concentrations. Although the correlation between plasma levels and dosage was inexact, toxic plasma concentrations were regularily attained with total daily doses greater than 50 mg/kg body weight. It is suggested that toxic bone-marrow depression induced by Chloromycetin is a dose-related pharmacological property of the drug. This dose-related form of bone-marrow depression disappears promptly when the drug is discontinued and may be unrelated to the problem of Chloromycetin-induced aplastic anemia. To reduce the risk of aplastic anemia, the current investigators suggest that even mild toxicity be

avoided by limitation of dosage. Plasma levels exceeding 15 mcgm/ml apparently offer no significant advantage in most infections responsive to the antibiotic. Since such levels can usually be attained with total daily doses of 25 to 30 mg/kg body weight (at this dosage bone-marrow depression rarely develops if the drug is given for limited periods) there is little practical advantage in giving higher doses. If prolonged high dosage can be justified, regular assessment of bone-marrow function is mandatory.—Scott et. al. (Los Angeles, Calif), New England J M 272: 1137, June 3, 1965.

It should be noted that Chloromycetin dosage recommendations published in the Physicians' Desk Reference, 1965, differ significantly from those given above. The PDR recommendations state in part:

"The concentration of active drug in blood should fall within (a range of 5 to 20 mcg per ml) over a major portion of the treatment period. Dosage of 50 mg per kg per day divided into four doses at intervals of six hours will achieve levels of this magnitude. These are attainable with either parenteral or oral therapy. Except in certain circumstances (e.g., prematures and infants under one month of age), lower doses may not achieve these concentrations. In moderately susceptible or in certain severe infections, dosages up to 100 mg per kg per day may be required with dosage reduction to 50 mg per kg daily as soon as clinical response occurs. When prolonged high dosage is necessary, toxic side effects may occur which call for dosage reductions or discontinuance of chloroamphenicol therapy. Adults and children with impaired liver and kidney systems may retain excessive amounts of the drug."—Republished from CLIN-ALERT[R], No. 168, June 23, 1965, by permission of Science Editors, Inc.

HEREDITARY DEAFNESS IN MAN

Scientists at Johns Hopkins University in Baltimore, Md., will attempt to identify and define different types of hereditary deafness in man. Their subjects will include families of Amish and Mennonite religious sects in Pennsylvania, Ohio, and Indiana, and families with members attending schools for the deaf.

This was announced by Miss Mary E. Switzer, Commissioner of Vocational Rehabilitation, in the Department of Health, Education, and Welfare.

"It is hoped," Miss Switzer said, "that the new knowledge about different kinds of hereditary deafness obtained from this project will help the counselors in the State rehabilitation agencies to predict the capabilities of deaf persons who have inherited their handicap for various reasons. Thus, the counselors should be better able to place them in jobs for which they are fitted."

The Vocational Rehabilitation Administration, which Miss Switzer heads, has approved a grant for the two-year Johns Hopkins University project. The Federal contribution for the first year will be $20,859, and it is expected that a similar amount will be granted for the second year. The sponsor's share is $3,450 for the first year.

The VRA administers the State-Federal vocational rehabilitation program to prepare disabled persons for, and place them in, suitable employment. This agency also conducts a rehabilitation research program and a training program for rehabilitation professionals.

Amish families will be included in the Johns Hopkins study because the University has extensive genealogical data about them. The Mennonite families were chosen because of a prevalence of deafness in this group. The other families were selected because more than one-third of the students in schools for the deaf have a family history of deafness. It is estimated that the same proportion of inherited deafness exists for the 250,000 deaf persons in the United States.

Co-directors of the Johns Hopkins project are Bruce W. Konigsmark MD, Assistant Professor of Otolaryngology, and Victor A. McKusick MD, Chief of the Division of Medical Genetics, at the University's School of Medicine.

METASTASIS OF EXPERIMENTALLY INDUCED SKIN TUMORS

William E. Poel. J Nat Cancer Inst 34(6): 759-776, June 1965.

Metastasis was a frequent phenomenon in mice maintained until their natural death, after chemical induction of a primary tumor in the interscapular skin. Eighty-four of 99 animals treated topically with 3-methylcholanthrene developed keratinizing epidermoid carcinomas at the primary site of malignancy. Among these, metastasis was most frequent in a regional lymph node. Lung metastases were also common, though less frequent. The remaining 15 developed sarcomas of the dermis and keratinizing carcinomas of the epidermis as concurrent multiple primaries. Among these, and by contrast with the preceding group, multiple sites of secondary involvement included metastases of the carcinoma, fibrosarcoma, or both, to the spleen, liver, heart, adrenal,

kidney, and pancreas, as well as to the regional lymph nodes and the lungs. Metastasis was not a causal factor in reducing the lifespan of the tumor-bearing host. The lifespans of females with induced tumors and metastases were appreciably longer than those of their tumor-bearing, metastasis-free cohorts, as measured from the time carcinogenic exposures were started. 1) Metastases were not found in mice whose primary tumors had base dimensions of 196 mm^2 or less. 2) Among animals with larger tumors, metastasis was not related to the dimensions of the primary neoplasm. The malignant potential of a fibrosarcoma to invade and destroy contiguous areas was manifested in mice with induced skin sarcomas and carcinomas by the destruction of the epidermal carcinoma in areas of "collision" between the two. Parasitic destruction of the carcinoma by intrusion and overgrowth of the sarcoma is described and illustrated. The findings highlight the value and feasibility of the use of autochthonous tumors in their native hosts, as laboratory tools for elucidation of mechanisms and factors regulating the metastatic spread of malignancies, and for evaluation of the validity, in the natural state, of hypotheses developed with experimental models of metastasis using transplantable tumors.

CORTICOSTEROIDS

Glaucoma

It has been recognized for several years that prolonged intensive local as well as systemic corticosteroid therapy may produce a form of secondary glaucoma. The present case is of interest in that the patient, a 17-year-old boy with "chronic blepharoconjunctivitis," had been using various ophthalmic steroid preparations for something over three years. When the patient complained of blurred vision and halos around lights the attending ophthalmologist found the intraocular pressure elevated (42 mm Hg in each eye) and suggested that the patient be hospitalized. This was in September, 1962. The intraocular pressure was very difficult to control and filtering surgery was considered. However, the patient was discharged and followed as an outpatient. Finally, in July 1963, the possibility of steroid-induced glaucoma was considered by the Glaucoma Clinic staff. All medication was withdrawn and during the following several months the intraocular pressure gradually subsided.—Mills & Oliver (London, Ont., Canada), Canad MAJ 92: 1084, May 15, 1965.—Republished from CLIN-ALERT®, No. 158, June 15, 1965, by permission of Science Editors, Inc.

COMMITTEE FOR RESEARCH IN THE IMMUNOLOGY OF ORGAN TRANSPLANTATION

Appointment of an advisory committee for collaborative research in the immunology of organ transplantation was announced today by Dr. Luther L. Terry, Surgeon General, Public Health Service, U.S. Department of Health, Education, and Welfare.

The committee will advise the National Institute of Allergy and Infectious Diseases, on ways to develop and coordinate methods, procedures, and resources for enhancing research in the immunology of organ transplantation, which Dr. Terry called "one of medicine's most challenging frontiers." The committee will also advise on the development of methods for evaluating and applying research results.

"The main obstacle to organ transplantation is a problem in immunology," Dr. Terry said. "The surgery is successful but the recipient rejects the transplant. The human body reacts to transplanted tissue in much the same way that it reacts to other invaders—viruses, bacteria, or other foreign substances. Little-understood defense mechanisms which protect against infection unfortunately 'protect' against transplanted tissue.

The immediate goal of the NIAID collaborative program in transplantation is a technique for matching graft donors and recipients in much the way patients requiring blood transfusions are now matched with blood donors. The advisory committee will be of great help to us in developing this program.

The members of the committee are from leading hospitals and university medical centers. The chairman is Dr. Bernard Amos, Professor of Immunology, Duke University, Durham, N.C.

Like other collaborative programs, the collaborative transplantation immunology program is carried out with the cooperation of universities, hospitals, and research and development firms working under contract with NIAID.

Background Data

In an effort to understand and eventually prevent tissue rejection, researchers are striving to answer two important questions: How does the body recognize the foreign invader, that is, the transplanted tissue? How can the body be "taught" to live with the invader?

The immediate goal of the NIAID collaborative program in transplantation is a technique for matching graft donors and recipients in much the way pa-

tients requiring blood transfusions are now matched with blood donors. Although advances have been made in tissue typing, the problem is far more complex than in blood typing. The reason has to do with the different goals of blood transfusion and organ transplantation. Ordinarily, when blood is transfused only the red blood cells (which transport oxygen) need survive, and blood matching helps attain this goal. But when an organ is transplanted all of its cells and tissues must keep working. It is the complexity of this problem which makes tissue typing more complex than blood typing.

The collaborative program in tissue typing will coordinate, primarily through contracts, the efforts of many university and commercial laboratories to find a tissue typing technique that works. Successful tissue typing will increase the percentage of successful organ transplants by minimizing tissue incompatibility, just as blood group typing paved the way for large-scale lifesaving blood transfusions.

The tissue of such organs as the kidneys, the liver, the lungs, and the heart is much more complex than blood. A perfect match such as is possible in blood typing may not be possible in tissue typing. Tissue typing, therefore, may have to be combined with drug or other therapy to bridge the gap between donor and recipient. That is the reason why the NIAID collaborative transplantation program will also study and compare various supplementary measures for insuring acceptance of the transplant.

The NIAID is also expanding its research grants program in transplantation with funds specially allocated by Congress in 1964 for this purpose. Medical scientists now working with NIAID support have achieved noteworthy success in kidney transplant studies. At Peter Bent Brigham Hospital, Boston, for example, researchers are using drugs to suppress rejection of transplants. At the University of Colorado, Denver, scientists use a procedure which involves drug therapy, irradiation, and removal of the thymus gland and the spleen (organs which play a role in the body's defense mechanism).

Thousands of people die each year from degenerative diseases of the kidneys, the liver, the lungs, the heart, and other organs. The science of tissue transplantation must still be considered experimental. But significant advances are being made. Medical scientists are not satisfied with the limited success achieved so far in kidney transplantation. They are working to overcome the even more formidable obstacles involved in human liver transplantation. And they are conducting laboratory experiments on transplantation of the lungs and the heart—in the hope that these organs will someday be routinely and successfully transplanted in man.

The collaborative program for transplantation immunology is under the immediate direction of Dr. John R. Overman, NIAID's Associate Director for collaborative research, and under the general supervision of Dr. Dorland J. Davis, Director of NIAID. —USDHEW, PHS, June 25, 1965.

DENTAL SECTION

ANNIVERSARY GREETINGS TO DENTAL CORPS

I am pleased to acknowledge this anniversary of the U.S. Naval Dental Corps. Each year the Dental Corps grows in professional stature in terms of more and better dental care, improved educational opportunities, and the ability to conduct research programs related to the clinical needs of Navy and Marine Corps personnel.

The progress of the Dental Corps is evidenced by the marked improvement in the oral health of our military population. The establishment of preventive dentistry rooms for mass applications of stannous fluoride is a most significant contribution to the health of Navy and Marine Corps personnel and to the posture and image of the Naval Dental Corps.

I congratulate the Dental Corps officers on their achievements and extend to them a cordial greeting on the occasion of this 53rd anniversary.

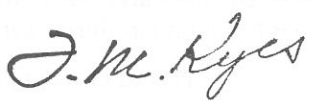
R. B. BROWN
Rear Admiral, MC, USN
Chief, Bureau of Medicine
and Surgery

ANNIVERSARY MESSAGE

On the occasion of the 53rd Anniversary of the U.S. Naval Dental Corps, I extend a cordial greeting. To all members of the Corps and to those who have worked unceasingly with us to form the team upon which the oral health of the Navy and Marine Corps depends, I express my thanks for your accomplishments.

Through the unceasing efforts of loyal and devoted personnel, the past year has been one of progress. Great strides have been made in implementing and extending our Preventive Dentistry Program. This is, undoubtedly, the biggest single factor in the achievement of our goal of better patient care and its corollary of better oral health for members of the Navy and Marine Corps. A program for the replacement of obsolete and obsolescent equipment has been instituted to maintain the Naval Dental Corps' efficiency commensurate with modern standards of office design. The visits of the Inspector General have established a closer correlation between the goals of the Bureau and the field activities. Conversely the problems of the field activities have been brought to the Bureau for sympathetic understanding and staffing. The resultant rapport has mutually benefited all concerned. The Postdoctoral Fellowship program has been instituted at a number of activities. Through the exemplary cooperation of personnel concerned, the program promises to afford earlier opportunity to the junior officer for advanced clinical training.

There are many other aspects of your cooperation that have served to enhance the image of the Naval Dental Corps. You may be assured that your efforts have been noted. I regard your past accomplishments as a promise for our continued advancement.



F. M. KYES
Rear Admiral, DC, USN
Assistant Chief of the Bureau of
Medicine and Surgery (Dentistry)
and Chief, Dental Division

INDIRECT PULP CAPPING

On page 22 of the *U.S. Navy Medical News Letter* 43(12), reference is made to recent research findings, which have been published in Abstract form by the International Association of Dental Research. Readers who are not members of that association may not have the Journal of Dental Research readily available. To emphasize the significance of those references, they are herewith summarized.

Damele, J. J., IADR 1961, Abstract 302. Seventy teeth displaying carious lesions which warranted strong suspicion of pulpal involvement, were treated by indirect pulp capping. This treatment consisted of incomplete caries removal, placement of CaOH, and a temporary alloy. After about 60 days, the caries was completely removed and a permanent restoration was placed. Pulpal exposure was unnecessary in 85 percent of the cases. In a subsequent six-month follow-up, all teeth were asymptomatic and vital. 90 percent showed increased radiopacity in the pulpal wall subjacent to the indirect pulp capping site.

DiMaggio, J. J. and Hawes, R. R., IADR 1963, Abstract 22. Pulp capping consisted of CaOH in methylcellulose paste, covered by zinc oxide and eugenol cement. In clinical reexamination at three-month intervals, up to 48 months, favorable results were obtained in 99 percent of 351 indirect pulp cappings, and 75 percent of 305 direct pulp cappings.

DiMaggio, J. J., Hawes, R. R., and Kiryati, A., IADR 1963, Abstract 23. Histological evaluation was made of teeth which were clinically normal six months after pulp capping: 84 indirect and 33 direct. Mild chronic inflammation was more common in the direct cases. Secondary dentin subjacent to the pulp capping formed more slowly in indirect cases. Calcific deposits occurred more often in the pulp chamber and less often in root canals, in the indirect pulp capping cases. Histological evidence of failure, at six months, appeared to parallel the clinical findings described in Abstract 22, but the number of cases and the short time interval were insufficient to support a definitive statement.—Dental Section, BUMED.

CARIES EXPERIENCE OF COMMISSARYMEN

A study conducted at the U.S. Naval Training Center, San Diego, California, by LT S. P. Wukelich, Jr., DC, USN, with CAPT R. R. Perkins, DC, USN, as Consultant, demonstrated that cooks and bakers have a greater number of teeth attacked by dental caries than other naval ratings.

Doctor Wukelich was provided with a roster of cooks and bakers by the Commissary Officer, and 128 dental folders of the ship's company were removed from the central record file for examination. At the same time, the dental folders of personnel

appearing just before and just after the commissarymens' folders in the file were also removed.

Sixteen of the commissarymen's folders (study group) were eliminated from the study for various reasons, e.g., they contained only "replacement" or "supplemental" records; they contained no record of examination or treatment subsequent to the initial examination; there was no record of the man having been seen by a dental officer for an inordinate length of time, etc. Similarly, 38 of 256 "fore and aft" folders (control group) were eliminated. Thus, data sheets were prepared on 112 individuals in the study group and on 218 in the control group.

The results are summarized in Table 1.

TABLE 1

	STUDY GROUP		CONTROL GROUP	
	Mean	Range	Mean	Range
1. Age in years	33.5	23-54	32.7	18-55
2. Years in service	8.2	1-28	8.0	1-25
3. Missing teeth upon entry into service[1]	3.6	0-19	2.7	0-27
4. Carious surfaces upon entry into service[2]	5.3	0-37	6	0-25
5. Restored surfaces upon entry into service	9.7	0-42	10.4	0-53
6. Surfaces becoming carious during service[3]	9.3	0-33	6.4	0-33
7. Surfaces restored during service[4]	7.5	0-33	4.9	0-24
8. Teeth extracted during service[5]	0.9	0-14	0.6	0-14

NOTES

1—Includes teeth marked for extraction upon initial examination and which *were* extracted soon thereafter.
2—Does *not* include any surfaces on teeth in item No. 3.
3—*May* include lesions missed by examiner in item No. 4, but *only* if reasonable scrutiny of subsequent treatment record *failed* to prove this to be the case.
4—Does *not* include surfaces in item No. 5 that were replaced incidental to treatment in item No. 6.
5—Does *not* include those teeth mentioned in note 1 above.

This study reinforces the opinions that many naval dentists have formed from their clinical experience. It also points up the need for further epidemiological studies in this group, as well as other rating service groups, to determine the extent of their individual oral health problems and the reasons for them.

From the data of this study, one can postulate that, as a population group, cooks and bakers develop 45% more carious surfaces; they have 35% more surfaces restored and have 50% more teeth extracted than other Navy ratings during service.

—Dental Division, BUMED.

PERSONNEL AND PROFESSIONAL NOTES

International Film Award. The U.S. Naval Dental Corps has been awarded the *Diplome d'Honneur* by the judges of the Third International Dental Film Meeting, which was held in Paris on March 8-12, 1965. The award was presented to RADM F. M. Kyes, DC USN, Assistant Chief of the Bureau of Medicine and Surgery (Dentistry) and Chief of the Dental Division, by the United States Information Agency, which provided liaison for presentation of entries from the U. S. A.

The award-winning motion picture is "Preventive Dentistry: The Prevention of Oral Disease," the first of a series dealing with a very challenging problem —that of educating the public in preventive dentistry measures. Prints have been furnished to every naval activity that has one or more dental officers attached, for this film was designed to teach and encourage good dental habits among all naval personnel, particularly those between the ages of 17 and 35. It deals with the dental problems most common at those ages, dental caries and periodontal disease. By means of animated drawings and scenes from the dental operating room, it demonstrates the habits that cause those diseases, the consequences of neglect, and the means of avoiding them.

Technical advisers for the film, produced by the Bureau of Medicine and Surgery, were Mr. Charles Green of the U.S. Naval Medical School, CAPT S. E. Tande, DC USN, and CAPT G. H. Rovelstad, DC USN, both of the U.S. Naval Dental School.

Conference on Advanced Education in Oral Surgery. Naval oral surgeons met on May 24-26, 1965, at the U.S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland, to confer on various aspects of advanced education in oral surgery. The opening session on Monday morning was held at the Bureau of Medicine and Surgery. Following the charge to the conference by RADM F. M. Kyes, DC USN, Assistant Chief of the Bureau of Medicine and Surgery (Dentistry) and Chief of the Dental Division, the agenda consisted of individual presentations, study groups, and workshops. Topics discussed were the present status and future requirements of the advanced education programs in oral surgery—the internships, fellowships, residencies, graduate/postgraduate course, and continuing education—as well as such related subjects as curricula, research, board requirements, and assignments.

Oral surgeons who participated in the conference were:

Dr. Gustav O. Kruger, Washington, D.C., Consultant

CAPT H. G. Green, DC USN, U.S. Naval Dental School, Chairman

CAPT W. W. Crowe, DC USN, Naval Hospital, San Diego, California

CAPT T. A. Lesney, DC USN, Naval Hospital, Portsmouth, Virginia

CAPT J. F. Link, DC USN, Naval Hospital, Great Lakes, Ill.

CAPT R. A. Middleton, DC USN, Naval Hospital, Oakland, Calif.

CAPT H. B. Marble, DC USN, U.S. Naval Dental School

CDR H. S. Samuels, DC USN, Naval Hospital, Pensacola, Fla.

CDR J. H. Scribner, DC USN, Naval Hospital, Chelsea, Mass.

U.S. Navy Dental Officer Presentation. CAPT R. F. Erdman DC USN, Dental Officer, U.S. Naval Station, Sangley Point, P.I., and the dental officer staff of the naval station, participated in the 57th Annual Convention of the Philippine Dental Association held 26-30 May 1965 at the University of the East Dental School, Quezon City, P.I. CAPT Erdman presented an illustrated talk entitled, "Life Saving Procedures, as Practiced by the Dentist." LT E. F. McGee DC USNR presented a table clinic entitled, "Complete Fabrication of Full Dentures." LT J. E. Carlson DC USNR presented an illustrated lecture entitled, "Endodontics." LT M. F. O'Halloran DC USNR presented a lecture entitled, "Community Water Fluoridation."

CAPT A. L. Raphael, DC USN, Dental Department, U.S. Naval Station, Charleston, South Carolina, presented a lecture entitled, "The Relationship of Periodontics to General Dentistry," before the Charleston Dental Society, on 1 June 1965 in Charleston, South Carolina.

CAPT H. G. Green, Executive Officer of the U.S. Naval Dental School participated in the Scientific Program of the Maryland State Dental Association, May 1-6, presenting a paper on Post Operative Care Following Extractions.

CAPT Frank J. Kratochvil, DC, USN, Head, Removable Partial Denture Division, U.S. Naval Dental School, presented a lecture entitled "A Procedure for Successful Partial Denture Treatment" at a meeting of the Tri-County Dental Society in Youngstown, Ohio, on May 6, 1965. He also presented four lectures, "Planning Your Partial Denture," "Mouth Preparation for Partial Dentures," "Designing Your Partial Denture," and "Partial Denture Occulsion and Insertion," at the 98th Annual Meeting of the Ontario Dental Association in Toronto, Canada, May 17-19, 1965.

CAPT S. E. Tande, DC USN, Head of the Audiovisual Department of the U.S. Naval Dental School, presented a lecture entitled, "Production Techniques in Pre-Clinical Dentistry," before the 7th Annual Meeting of the Council on Medical Television at the University of Michigan, Ann Arbor, Michigan, on May 18, 1965. In addition, CAPT Tande and LT W. B. Pitzer, MSC USN, Head, Television Facility, National Naval Medical Center, presented a videotape demonstration of the methods in which television is used in dental education at the U.S. Naval Dental School.

San Diego Dental Society Meeting Sponsored by 11 ND. CAPT G. R. Shaver DC USN, ELEVENTH Naval District Dental Officer, sponsored the June meeting of the San Diego County Dental Society on 21 June 1965 at the U.S. Naval Training Center, San Diego, California. Dental officers of the ELEVENTH Naval District presented the following symposia and table clinics:

Captain Galen R. Shaver, U.S.N.
District Dental Officer

CAPT W. W. Crowe DC USN USNH San Diego, California	The Surgical Correction of Oral and Facial Deformities
CAPT W. H. Lieser DC USN USNH San Diego, California	Prosthetic Appliance Used in Patient Rehabilitation

TABLE CLINICS

CDR P. E. Zeigler DC USN and CDR R. A. Grandich DC USN USNH San Diego, California	A Retrograde Amalgam Technique
LT M. C. Clegg DC USN and LT W. J. Carona DC USNR USNTC San Diego, California	Emergencies in the Dental Office
LT G. C. Fields DC USNR NDC Camp Pendleton, California	Lateral Sliding Periodontal Flap Procedure
LT C. R. Rodegerdts DC USNR NDC Camp Pendleton, California	Functional Impression Technique for Removable Partial Dentures
LT R. H. Schlapkohl DC USNR 13 Den Co 3 MAW MCAS El Toro, California	Dentistry for the Fighting Man (Field dental unit exhibit)

Naval Dental Corps Officers Graduate. On 25 June 1965 the U.S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland, graduated 36 officers of the U.S. Naval Dental Corps.

Dr. John J. Salley, Dean of the University of Maryland School of Dentistry, gave the commencement address. He told the graduates the dental practitioner of 1965 and after must be concerned with community health studies, including the behavioral sciences. Our oral health is now a national liability, he said; 98 percent of all Americans have or will have dental caries, two-thirds of all adults have some degree of periodontal involvement, and one of every five children has orthodontic problems. In addition, dental manpower is shrinking in proportion to the expanding population. The best answer to these problems is an organized program of preventive dentistry, including patient education, individual preventive procedures executed by dental health teams, and public health programs at the community level.

Dr. Salley said education of the laity in the full meaning of comprehensive dental care and application of available preventive measures can make our oral health status a national asset. He added that the dental practitioner, researcher, and educator must work in partnership to seek out and apply new and better preventive measures.

CAPT A. R. Frechette, DC USN, Commanding Officer of the U.S. Naval Dental School, presented the Commanding Officer's Award for Excellence in Operative Dentistry to LCDR Malcolm S. Davis, DC USN. This award was established in 1959. It is given each year to that officer of the Graduate and Postgraduate Courses most successful in his efforts to develop the skills of the general practitioner to the highest possible point.

LCDR Davis was first in the class; LCDR Herbert O. Scharpf, DC USN, was second; and LCDR Thomas L. Whatley, DC USN, was third. LCDR Davis was also honor man in that part of the course included in the off-campus graduate program of Georgetown University Dental School, in which LCDR Carlton J. McLeod, DC USN, and LCDR John E. Williams, Jr., DC USN, also received honors.

RADM C. L. Andrews, MC USN, Commanding Officer of the National Naval Medical Center, presented the Certificates of Completion with the assistance of CAPT Louis S. Hansen, DC USN, Head of the Officer Education Department. This was the first class to complete the Graduate and Postgraduate Courses under the new program whereby the students may major in one of the clinical specialties or take a course in General Dentistry. Graduates of the various programs and their majors are as follows:

Residency in Prosthodontics

CDR Edward P. Klecinic, DC USN
LCDR Philip W. Strauss, DC USN

Residency in Periodontics

LCDR Ernest T. Witte, DC USN

Residency in Oral Surgery

LCDR John S. Lindsay, DC USN (Second Year)
LCDR William R. Martin, DC USN (First Year)

Residency in Oral Medicine

LCDR Robert A. Gaston, DC USN
LCDR William K. Bottomley, DC USN

Postdoctoral Fellowship in Oral Medicine

LT George T. Eden, DC USN

Graduate and Postgraduate Courses

CDR Carl J. Swanson, DC USN (General Dentistry, Postgraduate)
CDR Everan C. Woodland, Jr., DC USN (Endodontics, Graduate)
CDR John H. Hegley, DC USN (General Dentistry, Graduate)
LCDR Charles K. Phillips, Jr., DC USN (General Dentistry, Postgraduate)
LCDR Ralph P. Huestis, DC USN (General Dentistry, Postgraduate)
LCDR Edward A. Miller, DC USN (General Dentistry, Graduate)
LCDR Charles G. Evans, DC USN (General Dentistry, Graduate)
LCDR Thomas L. Whatley, DC USN (Prosthodontics, Graduate)
LCDR Robert A. Vessey, DC USN (General Dentistry, Graduate)
LCDR James F. Scott, DC USN (Prosthodontics, Graduate)
LCDR John Koutrakos, DC USN (General Dentistry, Graduate)
LCDR Howard S. Tugwell, DC USN (Prosthodontics, Graduate)

LCDR Ollie V. Hall, Jr., DC USN (Oral Surgery, Graduate)

LCDR Barry E. Pines, DC USN (Periodontics, Graduate)

LCDR Donald E. Meister, DC USN (Oral Surgery, Graduate)

LCDR Herbert O. Scharpf, DC USN (Oral Surgery, Graduate)

LCDR Carlton J. McLeod, DC USN (Periodontics, Graduate)

LCDR Kenneth E. Brown, DC USN (Prosthodontics, Graduate)

LCDR John E. Williams, Jr., DC USN (Periodontics, Graduate)

LCDR Stanley E. Pepek, DC USN (General Dentistry, Graduate)

LCDR Albert G. Iandolo, DC USN (Periodontics, Graduate)

LCDR Frederick P. Eichel, DC USN (General Dentistry, Graduate)

LCDR James T. Christian, DC USN (General Dentistry, Graduate)

LCDR Malcolm S. Davis, DC USN (General Dentistry, Graduate)

LCDR Harry E. Semler, Jr., DC USN (General Dentistry, Graduate)

LCDR Richard C. Edwards, DC USN (Periodontics, Graduate)

LCDR George A. Stanton, Jr., DC USN (Oral Surgery, Graduate)

LCDR James E. Miller, DC USN (General Dentistry, Graduate)

Naval Dental Technicians Graduate. At graduation exercises on 18 June 1965 in the main auditorium, National Naval Medical Center, 33 Dental Technicians were awarded certificates for successful completion of advanced and specialized training courses presented by the Department of Enlisted Education of the U.S. Naval Dental School.

"Pride in the Military Service" was the theme of an address to the graduates by CAPT Herbert J. Towle, Jr., DC USN, Head of the Training and Standards Sections, Professional Branch, Dental Division, Bureau of Medicine and Surgery. During his inspirational address, CAPT Towle noted that great deeds are performed by every generation of military personnel, and that history so written is not a distant thing. In illustration, he stated that one of the graduates, Patricio P. Trinidad, DT1, was the son of Telesforo Trinidad, Machinist's Mate, 1st class, USN (Ret), who was awarded the Medal of Honor for conspicuous gallantry.

CAPT A. R. Frechette, DC USN, Commanding Officer of the Dental School, presented letters of commendation to those students with the highest averages in their respective fields of dental technology: Robert M. Michael, DT2, Advanced Prosthetic; Conrado M. Vida, DT1, Advanced General; Lee W. Tompkins, DT3, Dental Equipment Repair.

DT1 Vida also received the eleventh Thomas Andrew Christensen Award in recognition of his loyalty and devotion to duty in the U.S. Navy. Established by the Naval Dental School to honor the only naval dentalman posthumously presented the Navy Cross for extraordinary heroism, the award is presented, from time to time, to a graduate of an enlisted course of instruction who is chosen on the basis of his service record and service reputation.

CAPT H. G. Green, DC USN assisted by CAPT R. R. Troxell, DC USN, Head, Enlisted Education Department, awarded certificates to 20 graduates of the Advanced General School, 10 of the Advanced Prosthetic School, and 3 of the Basic Repair School.

Retention of First Term Enlisted Personnel. RADM E. G. F. Pollard, DC USN, CINCLANTFLT Dental Officer, presented the following message, as extracted from CNO letter to Flag and General Officers, before the Fleet and Force Dental Officers Conference on 8 June 1965:

A Modus Operandi for Retention

One of our LANTFLT Destroyers appears to have an answer to the Navy's number one problem —retention of high quality first term enlisted personnel. Since October of 1964 this ship has maintained a first term reenlistment that more than doubles the all-Navy rate. This success is attributed to the enthusiastic Career Information Team made up of top-notch chiefs and first class petty officers, and reflects the work of everyone from the Skipper on down. In addition to keeping the crew informed, shipgrams are sent home to wives and families each month as an integral part of the program.

The Career Information Team doesn't limit its interest in the crewman to reenlistment time. From the day a man reports aboard he is assured the team is interested in his welfare both aboard ship and at home. However, when a man does show interest in reenlisting or attending one of the Navy's career programs, his desires get top priority. *Speed is important.* If a man decides to ship over on a Sunday and the Captain is not aboard ship, he comes back

to reenlist the man and to see that he gets his 30 days leave and reenlistment bonus and is off the ship on the same day. This is real top to bottom attention. When the crew gets this kind of treatment it knows the command and the Navy has a *genuine interest* in it.

This concept may be very readily applied to our Dental Technicians at the Department level. Every officer has a personal responsibility to encourage our first term dental technician to consider the Navy as a career from the first day he reports aboard.

Dental Technicians Capture Swim Meet. Dental technicians of the U.S. Naval Training Center, San Diego, California, won eight of the ten swimming events scheduled for men in the 1965 Annual Intramural Swimming Meet held 14 June 1965 at NTC, San Diego, California. Of the more than thirty contenders, five dental technicians took ten of the twenty four top spots. Those winning top honors were: H. J. Peterson, DA, 1st place 100-meter and 50-meter Breastroke; C. B. Schmidt, DA, 1st place 50-meter Backstroke and 50-meter Freestyle; W. Collins, DA, 1st place 50-meter Butterfly, 2nd place 100-meter Freestyle and 3rd place 50-meter Freestyle; D. R. Brassfield, DA, 1st place 100-meter Butterfly and 3rd place 50-meter Butterfly; J. R. Chambers, DA, 3rd place 50-meter Backstroke.

The Dental Technician School team also swept the two relay events by winning the 100-meter Medley Relay and the 200-meter Freestyle Relay.

Dental Corps Retirements During the Fourth Quarter, FY 1965.

CAPT W. J. Demer
CAPT H. P. Gleisten
CAPT F. I. Gonzalez
CAPT F. L. Losee
CAPT M. F. McAfee
CAPT J. T. Mudler
CAPT D. W. Newman
CAPT L. H. Riney
CAPT W. A. Smith
CAPT H. G. Wunderlich, USNR
CDR H. J. Sancier

Restatement on Short Postgraduate and Refresher Courses at the U.S. Naval Dental School. To correct an erratum in the *U.S. Navy Medical News Letter* 45(11): 12-13, 11 June 1965, all readers are requested to strike out the title, "Courses Available to Active Duty Reserve Dental Officers," and pen in the corrected title, "Courses Available to Naval Reserve Officers of the Ready Reserve."

The subject courses are a portion of the continuing education program of the Naval Dental Corps. They are designed, principally, to provide refresher training for career dental officers. Dental officers who have had a year or more of formal education in the preceding two fiscal years are not eligible for these courses. Because the number of applicants always exceeds the capacity of the Naval Dental School, preference is given to applicants who currently are performing functions in the branch of dentistry covered in the course requested.

It was recently recognized that advances in teaching methods, principally television, permitted the U.S. Naval Dental School to accommodate larger classes. On a developmental basis, selected courses were, therefore, made available to dental officers of the Ready Reserve who were eligible for active duty for training in Fiscal Year 1965. Success of this program led to a broadening of the courses available in Fiscal Year 1966.

Quota allocations for career dental officers on active duty are assigned to Staff and District Dental Officers, and final action is taken by BuMed. Quota allocations for officers of the Ready Reserve are administered in accordance with BuPers Instruction P 1571.4K, *Catalog of Active Duty for Training for Naval Reserve Personnel,* FY 1966. All quotas are subject to change, in accordance with the needs of the Navy.

PREVENTIVE MEDICINE

STATUS OF GAMMA GLOBULIN PROPHYLAXIS FOR PREGNANT WOMEN EXPOSED TO RUBELLA

M&M Wkly Rpt, CDC PHS DHEW 14(16): 144, 24 April 1965. (Prepared by Surgeon General's Advisory Committee on Immunization)

Although gamma globulin in adequate dosage has been shown in several studies to suppress the clinical manifestation of rubella, evidence that it will or will not prevent congenital malformations among children of exposed mothers is lacking. Recently reported experimental studies suggest that gamma globulin may prevent the clinical manifestations of the disease with limited or no effect on the occurrence of infection and viremia. A few instances have been reported in which congenital malformations of the type associated with rubella infections were observed in infants born of asymptomatic mothers to whom gamma globulin was administered.

However, neither the experimental studies nor the isolated individual case observations serve directly to answer the question as to whether gamma globulin may exhibit a relative efficacy in protection against congenital malformations in the infant. Extensive studies dealing specifically with this question are in progress in the United Kingdom. Definitive results may be anticipated within the next year. Until such time as this information becomes available, it is not possible to formulate concrete recommendations regarding the relative desirability of gamma globulin administration to pregnant women exposed to rubella infections.

EIGHTEENTH WORLD HEALTH ASSEMBLY WORLD HEALTH ORGANIZATION

WHO Press Release, Sear 791-1-5, 25 May 1965.

The main decisions taken by the 18th World Health Assembly which met in Geneva, Switzerland, from 4 to 21 May 1965, are as follows:

a. *1966 Budget.* The Assembly unanimously adopted a working budget of $42,442,000 for 1966.

b. *Cancer: International Research Agency.* The Assembly established an International Agency for Research on Cancer. The Agency is sponsored by the Goverments of France, Fed. Rep. of Germany, Italy, the United Kingdom and the United States, and will serve as a means through which participating states and the WHO, in liaison with the International Union Against Cancer and other international organizations, may cooperate in the stimulation and support of all phases of cancer research.

c. *World Health Research Center.* The Assembly expressed its belief that the establishment of a World Health Research Center required further study and consideration, and requested that the WHO develop its research activities in epidemiology and the application of communications science as well as WHO's system of reference centers.

d. *Progress in World Malaria Eradication.* The population of the areas now freed from the risk of malaria amounted to about 813 million people or 52% of the population of the originally malarious areas of the world. Progress has been made in pre-eradication programs which have stimulated the development of a network of rural health services in the countries concerned. The Assembly urged interna-

tional agencies and governments providing bilateral assistance to give priority support to malaria eradication programs, particularly training and supplies, and to intensify the search for means of fully interrupting the transmission of malaria in problem areas. Governments of countries where malaria eradication has reached an advanced stage are urged to maintain vigilance against the restablishment of the disease.

e. *Major WHO Objective: Smallpox Eradication.* Worldwide eradication of smallpox is one of the major objectives of WHO. Major endemic areas remain in Asia, Africa and the Americas. Since the eradication campaign was launched by WHO in 1959, about 12 counties have eradicated smallpox. World eradication might be achieved within 10 years through an estimated international expenditure of $23.5 to $31.0 million. Up to 50 million doses of freeze-dried vaccine will be needed annually in addition to supplies locally produced or already being provided through bilateral arrangements.

f. *Vaccinations for International Travel.* As from 1 January 1967, smallpox vaccinations to be valid under the WHO International Sanitary Regulations must be performed with a vaccine that meets the standards set by WHO. In addition, the origin of the batch number of the vaccine used must appear on the vaccination certificate. A further change in the regulations adopted by the Assembly extends the period of validity of an international yellow fever vaccination certificate to 10 years. Previously, the validity was only 6 years. (NOTE: This change will be incorporated in the next revision of BuMed Instruction 6230-1D).

g. *Barbiturates and Tranquillizers.* In a resolution on the control of dependence-producing drugs, the Assembly noted with great concern the increasing abuse of sedatives and stimulants, such as barbiturates, tranquillizers and amphetamines, not classified internationally as narcotic drugs. It referred to the "epidemic-like spreading of this abuse, particularly among young persons in certain countries" and recommended that Member States place such drugs on medical prescription and that intensive health education with regard to the dangers of this abuse should be promoted as well as further research into the epidemiology of drug dependence.

h. *Monitoring System for Adverse Drug Reactions.* Member States were invited to develop as soon as possible national monitoring systems for adverse drug reactions with a view to taking part in an international system under the aegis of WHO. The Assembly urged the international collection and distribution of information on adverse drug reactions. The Government of the United States of America offered to provide facilities for the processing of information on adverse drug reactions under the auspices of WHO.

i. *Program for 1967–1971* The Assembly approved a general program of work for 1967–1971. It is WHO's fourth 5-year plan. The same general headings as in previous programs are found: strengthening of health services, measures against communicable diseases and non-communicable diseases such as cancer, cardiovascular diseases and mental illness, environmental health, education and training, the continuation of services of worldwide interest, and the intensification of medical research. Stressed are: the needs of the newly independent countries; adverse reactions to pharmaceutical preparations; the effects of micro-contaminants such as pesticides, food additives, radioactive residues and the like; human reproduction; world population trends, and communications science.

j. *124 Member Countries.* Three countries—Malawi, Malta, and Zambia—acceded to independence since the last World Health Assembly, became full Members of WHO this year. WHO now has 121 Members and 3 Associate Members (Mauritius, Qatar, and Southern Rhodesia).

k. *1966 Assembly.* The 19th World Health Assembly will be held in Switzerland.

A POOR MAN'S "KINSEY"

Abstracts of Current Literature on Venereal Disease, PHS, DHEW, No. 1:31, 1965.

As part of a campaign against VD on a British cruiser in the Far East, the author submitted questionnaires to about 550 enlisted men to better determine the sailor's attitude concerning extra-marital sex contact. Questionnaires were submitted to the men in groups of 10 to 30 at a time following a lecture and question period on venereal diseases; 470 questionnaires were completed. Questions asked and total answers, tabulated individually as to three groups (married, engaged, fancy free), are presented —followed by certain suggested angles of approach to the VD control problem among sailors. The author concludes: (1) Chastity for its own sake is no longer thought a merit. (2) The social stigma of VD has virtually disappeared. (3) Alcohol still remains a major factors in causation by weakening of resistance to temptation. (4) Fear of VD is still a powerful deterrent. G. R. Wheldon. J Roy Nav Med Ser, Alverstoke, 50:109–113, Summer 1964.

DDVP-RESIN FORMULATIONS AS DDVP "VAPORIZERS"

US National Pest Control Assoc. Tech. Release No. 11-63 (1963) Info. Circular on the Toxicity of Pesticides to Man, WHO, No. 14 July 1964, pg. 6–7.

A new DDVP (dichlorvos) formulation has been registered with the United States Department of Agriculture; it is a resin containing 20% dichlorvos and is available as 20% Vapona Insecticide Resin Strip or 20% Vapona Insecticide Resin Strand.

The release reports that, according to the manufacturers (Shell Chemical Co.), one resin strip maintains a concentration of 0.03 to 0.2 micrograms of dichlorvos per litre of air in a 1000 cu. ft. enclosure, while up to 1.0 micrograms per litre of air is considered safe for continuous exposure to humans.

It quotes the following safety precautions given on the labels of the above products: "Do not get in mouth, harmful if swallowed. After prolonged storage, a small amount of liquid may form on the strip (or strand). Do not get liquid in eyes. Wash hands thoroughly with soap and water after handling strip (or strand). Do not contaminate feed, water or foodstuffs, milk or milking utensils. Keep out of reach of children." and explains that "Do not contaminate feed, water, etc." means that there should be no *direct* contact between the strip (or stand) and the foodstuffs and utensils, although they may be in the same room as the insecticide.

The release stresses the importance of personal hygiene and of following the manufacturer's instructions carefully, and recommends that the formulations should not be used where pet birds are housed.

PRODUCTION OF METABOLIC DEFICIENCIES AS A POSSIBLE APPROACH TO INSECT CONTROL

Levinson, Z. H., (Hebrew Univ., Jerusalem, Israel). Bull Res Coun Israel, 10E (3/4) 116–24 (1963). Excerpta Med., Pub Hlth Social Med & Hyg, 10, 799 (Feb 1964) Abstracts from Pub Hlth Engineering Abstracts, XLIV (10): 330 (Oct 1964).

Investigation of comparative physiology and biochemistry is proposed for the planning of alternative methods of pest control in view of the likelihood of the ultimate development of resistance to all insecticides now in use. Essential metabolites such as nutrients and hormones and the function of symbiotic microorganisms in insects hitherho studied are briefly reviewed. From the comparatively few studies on the effect of antimetabolites on insects, it can be inferred that their growth and reproduction is severely impaired by incorporation of vitamin purine or sterol antagonists in their food. Feeding of antibiotics was also found to deprive certain insect species of their essential symbiotes and to result in death of their larvae and eggs. The growth response of *Dermestes maculatus* Deg. to synthetic diets with addition of 4 vitamin antagonists is described. Their larval period on a control diet containing hyperoptimal vitamin levels was retarded 1.60 to 1.75-fold after the addition of 0.23% neopyrithiamine, 1.13% pyridine-3-sufonic acid, 0.23% pantothenol or 0.11% desoxypyridoxine. Repeated administering of antimetabolite to an insect population could substantially reduce the number of generations in a given time. The effect of these antimetabolites has been designated as "insectistatic." Irreversibly acting antimetabolites should be preferred as insectistatic agents because their effective concentration will be independent of the constitution of the insect's food. Handling them would also be safer than handling the generally cytotoxic chemical sterilizants. Joint application of insectistatic agents with symbioticides might reinforce the action of insecticides to resistant strains. Resultant metabolic deficiencies may thus be a possible, though essentially untried, means of controlling insects.

EVALUATION OF A "SNOW-MAN" MACHINE

Joy and Lachapelle: A portable non-electric sub-zero freezer, Military Medicine, 129:12, 1964.

Introduction

The authors describe a method utilizing "snow" manufactured by CO_2 gas released into a polystyrene foam plastic container to maintain viral specimens in a frozen state incident to preservation and shipping to an identification laboratory.

The appearance of a "snow-man" machine* on the commercial market prompted an investigation into the possibilities of utilizing this method of compressing the CO_2 snow into hardened cakes as a possible improvement over the aforementioned method.

Technical information of primary interest investigated are as follows: (1) simplicity of operation, (2) present yield of "dry-ice" from a 50 pound CO_2

* Manufactured by The Chemical Rubber Co., Cat. #610240, 2310 Superior Avenue, Cleveland, Ohio.

cylinder, (3) safety of operation, (4) temperature parameters, and CO_2 carbon dioxide, (5) duration of storage at temperatures $-10°$ C and below, and other pertinent data.

Materials and Methods

a. Materials
   1. Cylinders containing 50 pounds of CO_2 procured from the Naval Supply Center.
   2. Snow machine provided by the U.S. Naval Aviation Safety Center, Norfolk, Virginia.
   3. Polystyrene containers described in article.
   4. Shipping vials containing 1.5 ml of NIH veal infusion broth.
   5. Thermometers and weighing scales.

b. Method
   1. With the tubing supplied the "Snow-man" was connected to a tank of CO_2. (Fig. 1)
   2. CO_2 usage was determined by weighing. Each cake was weighed also.

Results

Figure 3 illustrates the temperature-time relationship relative to maintaining temperatures of $-10°$ C. and lower.

Tests 1, 2, 3, and 4 were conducted as indicated in Table 1. In addition in Test 3, box B and contents were precooled at 4° C prior to icing. Test 4 was conducted by precooling box B and contents as in Test 3 but storing at an environmental temperature of 4° C.

Discussion

Use of the "Snow-man" machine markedly simplified the method for utilizing CO_2 gas in the manufacture of "dry-ice". Loss of CO_2 to the atmosphere is minimal due to the closed system employed.

The cakes produced are easy to handle as compared to free snow. In addition, compressing the snow into hardened cakes enhances the cooling period (fig. 3) as compared to use of free snow previously described. The extended freezing period increases the chances of the viral or pathological specimens being received at a diagnostic laboratory in a frozen stage.

Safety of operation is ensured by two safety valves; one chamber and one hinge type. The danger of asphyxiation is reduced due to the closed system employed, especially when operated in closed spaces such as the sick-bay vessel.

Thirty-eight pounds of CO_2 produced approximately 17 cakes of about 310 grams (0.7 lbs) weight each or a total of about 11 pounds.

Summary

The efficiency of a "snow-man" machine in manufacturing "dry-ice" cakes from CO_2 gas was investigated.

Maintenance of temperatures below $-10°$ C was significant as compared to studies previously conducted using "free snow".

Simplicity and efficiency in producing the formed cakes was demonstrated; 38 lbs. of CO_2 gas producing 10 to 12 lbs. of "dry-ice" cakes.

Safety and utility of making one or more individual cakes as compared to handling bulk snow was demonstrated.

TABLE 1

Test conditions: Tests 1 and 2 were conducted using Box B only. Tests 2 and 3 were conducted by placing Box B into Box A to provide double insulation.

	Test			
Test Criteria	1	2	3	4
CO_2 utilized (lbs)	38	37	38	36
CO_2 cakes produced (lbs)	7	11	12	10
Temperature prior to adding	22°C	22°C	4°C	4°C
Environmental storage temp.	22°C	22°C	22°C	4°C

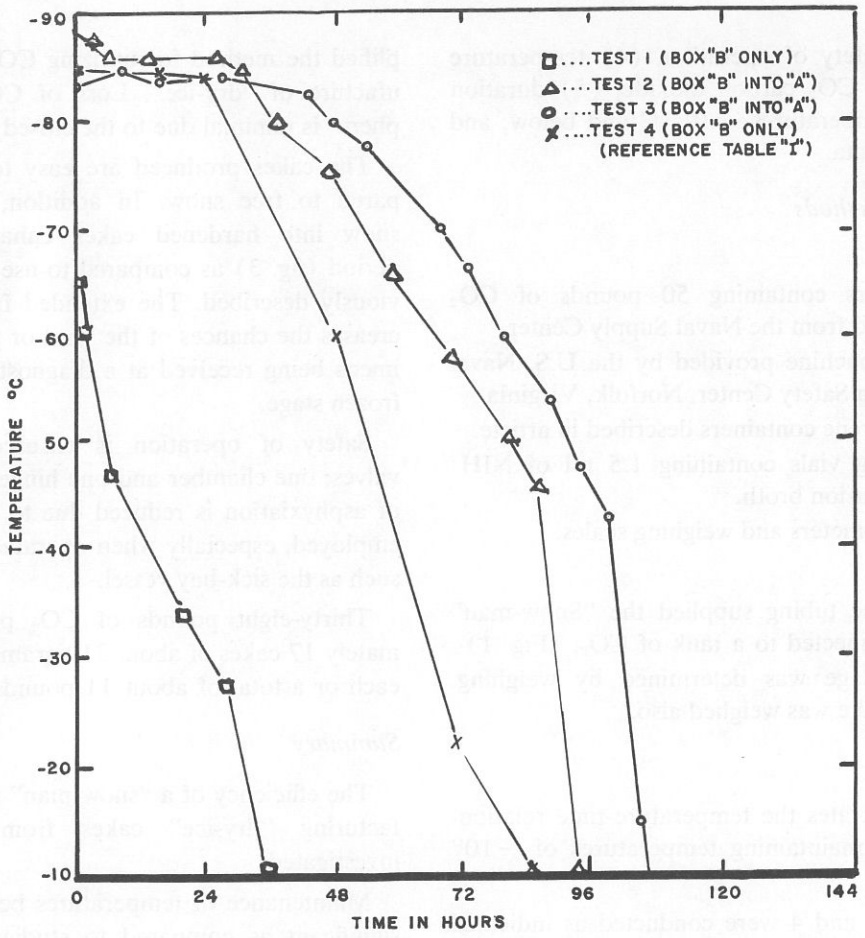


Figure 3. Time vs temperature

WATER-BORNE *SALMONELLA TYPHIMURIUM*, RIVERSIDE, CALIFORNIA

Weekly Morb and Mort Rpts, CDC, DHEW, PHS, 14(22&23): 185–186; 194–195, 5 and 12 June 1965.

The extensive outbreak of gastroenteritis in Riverside, California, which began in mid-May, has been determined to have been caused by *Salmonella typhimurium*. Although transmitted through the municipal water supply, the mechanism of contamination has not yet been completely worked out.

The clinical syndrome has varied widely. In children, diarrhea and fever occurred in almost all cases. Fever of 102–103° was common, and in a few cases was as high as 106°. Diarrhea was frequently bloody and in one case, blood loss was sufficient to have necessitated transfusion. Nausea, vomiting, and abdominal cramps were also common complaints. Adults generally suffered a milder illness with severe abdominal cramps and fever of 101–102° being the most common symptoms; diarrhea was also common, but nausea and vomiting were infrequent. In both children and adults, the duration of illness varied with the severity, lasting 10 days longer in the most severe.

By 1 June, approximately 14,000 cases are estimated to have occurred among the population receiving municipal water. An additional 2,000 or more cases are thought to have occurred during the same period among residents of nearby communities who work in or have frequent contact with Riverside. Since chlorination of the water supply on 2 June, at least 2,000 more cases may have occurred among Riverside residents as a result of secondary spread within the community.

House to house sample surveys were conducted throughout the city proper and in adjacent communities on 1 June; the over-all attack rate among the

110,000 persons receiving municipal water in their homes was 12.7%. Age specific attack rates were remarkably uniform, although somewhat higher among infants and young children.

An intensive telephone survey of 47 early cases, none of whom had had prior contact with any known cases of gastroenteritis, was conducted to determine a possible common source. These cases were selected from all age groups and from all parts of the city. Most of them were culturally confirmed by the isolation of *S. typhimurium*. No food item, store, or public event in common could be identified within this group. Such widely used items as milk and eggs were eliminated by the diverse sources of these items and the significantly large number of the infants who had never consumed them. All but 2 of these cases regularly drank the city's unchlorinated tap water.

Because the water comes from numerous deep wells in several locations and is distributed, according to demand, both directly through the main pipe line, and indirectly through a series of reservoirs, it has been difficult to establish the pattern of distribution within the city.

Six water samples contained *S. typhimurium*. These samples were obtained from several reservoirs and several places in the distribution system. Because the positive samples were found in diverse locations and the cases themselves were widely distributed, it is presumed that the source of contamination must lie somewhere near one of the main sources of water supplying the city. All of the main wells, however, have been functioning without known defects which would permit contamination; no positive cultures have been found in extensive samples taken from these sources.

As perplexing as the source of the contamination, is the complete absence of elevated coliform counts in routine samples obtained daily from various points throughout the city prior to and during the outbreak. Intensive efforts are continuing in an attempt to answer these questions.

DELUSORY PARASITOSIS

Waldron, William G., Los Angeles County Hlth. Index, 19th Rpt. Week, ending 15 May 1965.

Delusory Parasitosis or Delusions of Parasitosis are diagnostic terms applied to the condition in which an individual has a mistaken and unshakable belief that live organisms such as mites or other arthropods are present in or on his skin. This individual frequently collects "specimens" and submits them to an entomologist for identification. Usually the microscopic examination of this material disclose it to be debris unrecognizable as an arthropod. Frequently, negative microscopic finding will not be satisfying to the individual complainant, and he will attempt to get additional "specimens" for identification.

For persons suffering from this delusion, the problem is both real and serious. They are eager to describe each detail of their supposed infestation and appear to be more interested in getting rid of the "bugs" than in physical relief from the "bites" and their effects. The person very casually handles the "infested" objects and the "bugs" without any evidence of fear. It is important, that the entomologist make a thorough check of the specimens, and if necessary, of the premises, so as to rule out any possibility of an actual arthropod infestation.

The person often will try to treat himself with salves and ointments, or with repellents, insecticides, or whatever he feels will give him freedom from his infestation. Cases of this type are directed to consult a physician for diagnosis and treatment. Most resist this suggestion and insist that there must be a better "insecticide" that will kill their "bugs".

Treatment of such patients is more difficult than if an infestation existed. In these cases, lotions and insecticides are ineffective. Patience and tact are necessary in order to convince the patient to seek proper medical care. Dermatologic consultation may be of value in ruling out mite bites, avitaminoses and other skin diseases associated with paresthesias. Sometimes psychiatric aid is indicated in such cases, many refuse to accept it.

KNOW YOUR WORLD

Did You Know:

That in 1963, for the 17th consecutive year, the incidence of diphtheria in the United States declined to a record low. The case rate was 0.16 per 100,000 population. But, the case-fatality ratio of 16.0% was the highest ever reported. Most likely, the high proportion of severe and fatal complications has resulted from a low index of clinical suspicion. The mild cases are not diagnosed, and other cases become more serious because of the delay in treatment. (1)

That to supply Rio de Janeiro with sufficient water, the world's largest municipal underground pumping station is under construction in the Brazilian mountains? (2)

That tiny, powerful magnets are being sewn into the waistbands of ski pants to help find avalanche victims. (3)

The substance responsible for *ciguatera,* a serious and sometimes fatal disease caused by the eating of a variety of tropical marine fish, was first isolated at the Hawaii Marine Laboratory. Now, the same laboratory has determined by pharmacological and biochemical assays, that the mode of action of the toxin is inhibition of cholinesterase causing death by asphyxiation in rats, mice and rabbits given lethal doses of the crude ciguatera toxin. A treatment regimen utilizing atropine and protopam chloride will prevent death of the animals in all cases. (4)

That of 8,641 persons (88% of the population) examined in Tecumseh, Michigan, 2.9% of the males and 10.2% of the females had thyroid enlargement (goiters)?

Among females over age 19, 15% had enlargement. Almost 40% of the salt purchased during a month of study was not iodized. Lacking recent education, people pay little attention to whether or not the salt they purchase is iodized. (5)

That a total of 4,054,000 births were registered in 1964 in the United States?

This is the smallest number for any year since 1955 and the third consecutive annual decrease. The birth rate for the year was 21.2 per 1,000 population ; continuously declines since 1957. (6)

That in 1964, there was one human death due to rabies and there were 4,784 laboratory-confirmed cases of rabies in the United States?

This is 800 more than the 3,933 recorded in 1963, a 20% increase in the annual incidence. Dog rabies declined to an alltime low of 409 cases, whereas 10 years ago, 8,083 dog cases accounted for 56% of the animal cases in the United States. More rabid bats were recorded in 1964 than in any year since 1953 when the first positive bat was diagnosed in the United States. (7)

That trying to pursuade Polynesian ladies to chuck their aluminum G.I. messkit pots and pans is a difficult task for nutritionists of the United Nations Food and Agriculture Organization?

The FAO nutritionists want the Polynesians to return to the time-honored method of cooking and wrapping foodstuffs in big leaves. The messkit pots and pans have become a status symbol. According to a FAO nutritionist, the fresh leaves are the original disposable dishes and are not only more sanitary but also preserve essential nutritional elements. (8)

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EDITORIAL DESK

MEDICAL SERVICE CORPS TRAINING

Educationally speaking, fiscal year 1965 has left an indelible mark on the Medical Service Corps. The efforts expended in support of training has far exceeded those of previous years, and every section of the Corps was represented in the over-all MSC training program.

The development of competent administrators and managers is a most urgent problem within the military services today. One needs only to review the current literature in this field to realize the importance assigned to the professional development of personnel within both civilian and military organizations. We of the later group, as members of the Medical Department management team, must address ourselves to the tasks involved in assuming and effectively discharging the responsibilities of the many and varied managerial and administrative functions of the Medical Department.

The increasing demands upon us to be knowledgable in the related fields of management require that all officers take necessary action to meet the challenges of the future. This situation is not new, but the degree of urgency and the scope of problems management must solve today are unprecedented. To be effective, the Medical Department management officer must recognize that changes are necessary. He must be a person who is capable of coping with the rapid obsolescence of any new procedure

and be prepared not only to recognize the need for change, but to be an integral part of that change.

In view of this challenge, one of the primary objectives of the Bureau in training Medical Service Corps officers is to develop their potential to the utmost of their abilities. A recent review of the academic accomplishments of the last nine classes that graduated from the Naval School of Hospital Administration reveals the emphasis these graduates have placed on completing their education.

In evaluating the following data, it must be recognized that officers who graduated from NSHA from 1956 through 1960 did not receive academic credit from The George Washington University. As a result of the Naval School of Hospital Administration becoming affiliated with The George Washington University, NSHA graduates since 1961 receive approximately 45 semester hours credit for the successful completion of the curriculum at that school. Therefore, it is readily recognized that it has been less difficult for officers in the later classes to complete their degree requirements. Yet this observation takes on more significance when one considers that more than one officer in six in the former classes have managed to complete the baccalaureate degree requirements, and some have received their Master's degree.

There are numerous factors to be considered in pursuing an education in a formal academic environment. This endeavor becomes quite complicated in cases where officers pursue their education on a part-time, off-duty basis in academic programs similar to those in which a great number of the MSC officers are now enrolled. Each officer in this category is to be commended for his efforts in pursuit of this worthwhile goal.

While we emphasize the pursuit of education as a worthwhile endeavor, we must recognize, however,

Academic Achievement of NSHA Graduates
1956-1964

NSHA Class Number	Graduated	No. Naval Off. in Class	M.A. Degree	B.A. Degree	Sr. Class Standing	Jr. Class Standing	Soph. Class Standing	Fresh. Class Standing	Retired
17	1956	24	0	5	0	2	0	3	4
18	1957	34	3	6	0	2	0	8	8
19	1958	24	0	4	0	0	2	3	8
20	1959	34	0	5	1	2	4	2	4
21	1960	39	0	7	0	1	2	3	2
TOTAL		155	3	27	1	7	8	19	26
22	1961	34	6	11	4	4	10		
23	1962	36	3	6	3	13	11		
24	1963	36	1	7	3	7	18		
25	1964	36	0	13	7	14	1		
TOTAL		142	10	37	17	38	40		

that education cannot and should not be limited to earning a degree. Learning in order to become a more effective Medical Service Corps officer is a more desirable goal. Moreover, such an endeavor must be sought in addition to, but not at the expense of, over-all performance of duty.

The Medical Service Corps training program is specifically outlined in BuMed Instruction 1500.7A which covers part-time training while BuMed Instruction 1520.12B fully outlines the policies of, and procedures pertaining to, assignment to full-time duty under instruction for *all* categories of MSC

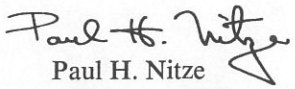
officers. All MSC officers are encouraged to participate, if at all possible, in some formal training program during the coming year.—Medical Service Corps Dvision, BUMED.

TO THE OFFICERS OF THE MEDICAL SERVICE CORPS

It gives me great pleasure to extend to all of you my congratulations and best wishes on this 18th anniversary of the establishment of the Medical Service Corps of the U.S. Navy.

Your record of achievements over the short span of years since the founding of your Corps fully justifies your pride in it. The men and women who wear your emblem have become well known for their abilities, devotion to duty, and spirit of service. I have every confidence that you will continue to discharge your responsibilities with the determination you have demonstrated so well in the past.

To each and every member of the Navy Medical Service Corps, I extend my personal regards and wish you a HAPPY BIRTHDAY!



Paul H. Nitze

On this 18th anniversary of the establishment of the Medical Service Corps, I extend my greetings and congratulations to each of you.

An anniversary is an appropriate occasion to look back and review previous accomplishments with pride and gratification, and you well deserve to reflect on the past since the excellent reputation your Corps has achieved during the past eighteen years is widely recognized. Each anniversary is also an occasion for looking forward and in resolving to better prepare yourselves to make greater contributions and to assume additional responsibilities. I have every confidence that you will do so.

I extend my best personal regards and wish you a HAPPY BIRTHDAY!

R. B. BROWN

COMBAT PAY

Washington (AFPS)—Deputy Secretary of Defense Cyrus R. Vance has signed a new Department of Defense directive modifying the policy established last year concerning eligibility of military personnel to receive special or "combat pay" for those subject to hostile fire.

The new policy will permit all military personnel located in geographic areas designated by the Secretary of Defense to become eligible for the special pay. The unified or specified commander concerned will be responsible for determining specific locations or areas within the previously designated area in which personnel may be excluded from receiving the special pay due to lack of risk.

The new directive also authorizes the special pay of $55.00 per month to be paid to the beneficiaries of personnel killed or to the military member, if wounded or injured by hostile fire, explosion of hostile mines, or any other battle action, regardless of whether or not the incident occurred in a previously designated area.

Under this new modified policy, all U.S. military personnel serving in the Republic of Viet-Nam will be eligible for the special pay, unless certain areas are excepted by the unified commander.

Other geographic areas in which military personnel may become entitled to the special pay will be designated by the Secretary of Defense as appropriate.

In separate action, the Department of Defense had previously provided authorized special pay for duty subject to hostile fire in the Dominican Republic for those personnel who were killed or wounded by hostile fire, explosion of hostile mine or any other hostile action in that operation.—Armed Forces Press File.

ANNUAL ARMED FORCES ORTHOPEDIC SEMINAR

The Annual Armed Forces Orthopedic Seminar will be sponsored by the Canadian Armed Forces and will be held at the National Defense Medical Center, Alta Vista Drive, Ottawa 4, Ontario, Canada, 20–23 September 1965.

All surgeons and residents in this specialty, on active duty are eligible to attend.

It is anticipated that a round-trip Government air lift will be provided departing Naval Air Facility Andrews, Washington, D.C. on 19 September and return on 23 September.

Only a limited number of officers can be authorized to attend the seminar on travel and per diem

orders chargeable against Bureau of Medicine and Surgery funds. Eligible and interested officers who cannot be provided with travel orders to attend at Navy expense may be issued Authorization Orders following confirmation by this Bureau that space on the aircraft is available. Requests should be forwarded via chain of command in accordance with BUMED INSTRUCTION 1520.8A. *NOTE:* The deadline for receipt of requests in this Bureau is 20 August 1965.—Professional Division, BUMED.

DEPARTMENT OF THE NAVY

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